LIBRARY
STATE PLANT BOARD
OCT 4 - '37

UNITED STATES
DEPARTMENT OF AGRICULTURE

BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

VOLUME IV

Digitized by the Internet Archive
in 2013

http://archive.org/details/newsletter37no10

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR AUGUST 1937

Vol. IV, No. 10 (Not for publication) October 1, 1937

FRANCIS EVERETT BAKER

Francis Everett Baker, assistant entomologist of the Division of Fruit Insect Investigations, stationed at Moorestown, N. J., died on September 15, 1937, following several months of serious illness. Mr. Baker was born at Baldwinsville, Mass., on July 1, 1903. He was graduated from the Massachusetts Agricultural College in 1926. That year Mr. Baker reported for work on the Japanese beetle investigations, upon which he was engaged up to the time of his death. His field of investigation included the use of soil insecticides for the control of the larvae of the Japanese beetle, and other methods of destroying the immature stages of this beetle in soil.

RESEARCH ASSISTANT TO THE CHIEF OF THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE APPOINTED

On September 7 P. N. Annand was appointed Special Research Assistant to the Chief of the Bureau, and C. M. Packard was appointed to succeed Mr. Annand as Chief of the Division of Cereal and Forage Insect Investigations. Mr. Annand will devote his time to unifying the Bureau's research and making it more effective. This research covers a very wide and constantly growing field. Divided among twelve subject matter divisions, it deals with insects and their relation to man, animals, and crops. Effective control measures for insect pests must be based on exact information on the way the insect looks and lives and on its relations to its hosts. This calls for knowledge of the hosts and their habits and extends into chemistry as it pertains to the developing of insecticides. Central planning is essential in getting the most out of this research.

FRUIT INSECT INVESTIGATIONS

Headquarters established at Eugene, Oreg., for work on filbert insects.--Field headquarters for the work on filbert insects in the Pacific Northwest have been established at Eugene, Oreg., with S. M. Dohanian in charge. The address is P. O. Box 346.

Springfield, Mass., substation discontinued.--It became necessary to close the Japanese beetle substation at Springfield, Mass., at the end of August. I. M. Hawley, who has been in charge of this substation, has returned to duty at the Moorestown station.

Japanese beetles feed on fruit of grapevines.--Heretofore no feeding by Japanese beetles on the fruit of grapes has been observed. On August 13, however, extensive feeding by beetles on bunches of grapes at Holmdel, N. J., was observed by C. H. Hadley and W. E. Fleming, of the Moorestown, N. J., station. The variety most heavily attacked was Portland, then just about ready for picking. The beetles ate holes in the skin, commencing at the top of a bunch and sometimes attacking most of the berries on the bunch. Some feeding was also observed on the variety Ontario, but this variety appeared much less susceptible than Portland. The owner of the vineyard stated that he had also observed some feeding last year on Jersey Muscat, a variety which ripens in early September. Foliage feeding was observed in considerable abundance throughout the vineyard, the varieties most heavily attacked being in the following order of susceptibility: (1) Delaware, (2) Brighton and Salem, and (3) Fredonia and Niagara. Part of the vineyard had been sprayed with the standard derris-rosin residue emulsion combination, two and three applications having been made after the beetles commenced feeding on the fruit of the Portland variety. While the spray appeared to be effective in keeping beetles off the foliage, it did not protect the fruit. However, when several rows were sprayed with the same material at double strength (6-6-100), most of the beetles were driven off the fruit, except where the bunches were so thoroughly protected by the leaves that the spray did not reach them. It was noted that honeybees were also very abundant and feeding on the grapes. They did not seem to break the skin of the grapes but fed only on those fruits the skin of which had already been broken by beetles. It was also noted that the derris-rosin residue spray had apparently very little repellent effect on the bees. Fifteen to 30 minutes after the spray had been applied, while practically all of the beetles had been dispersed by the spray, except from those bunches which were well protected by leaves, the bees seemed to be present in fully as large numbers as before the spray was applied and were apparently unaffected by it.

Laboratory testing of insecticides for the Japanese beetle.--At the Moorestown laboratory W. E. Fleming has completed the season's tests with various materials as stomach poisons and repellents against the Japanese beetle. During the season 1,540 cage tests were made, involving a total of 308,000 beetles. Fifty-eight materials of the E series, prepared by the Division of Insecticide Investigations, and 15 other materials were tested.

Recovery of Tiphia popilliavora (Koiwai strain) colonies.--J. L. King, L. B. Parker, and M. H. Brunson, of the Moorestown station, have recently completed scouting of 125 colonies of Tiphia popilliavora (Koiwai strain), an imported parasite of the Japanese beetle, which were liberated in the generally infested area in 1934. The parasite was recovered at 70 of these colonies, representing a 56-percent colony recovery. As the colonies are only 3 years old, no effort was made to determine the relative abundance of the parasite at the different colony points.

MEXICAN FRUIT FLY CONTROL

No Mexican fruit flies collected in Texas.--Traps failed to take any *Anastrepha ludens* Loew, either in Texas or in Matamoros and Reynosa, although other fruit flies were trapped in Texas as follows: *A. serpentina* Wied., 74; *A. acidusa* Walk., 1; *A. pallens* Coq., 181. The results obtained from trapping and fruit inspection are shown in the following table:

Species	Texas	Mexico
Adults trapped		
A. serpentina	74	1
Premises	54	1
A. acidusa	1	0
Premises	1	0
P. pallens	181	4
Premises	73	2
Total	256	5
Larvae collected		
A. ludens	0	*191
A. acidusa	0	*1
Total		192

*From market fruit.

Large Texas citrus fruit crop in prospect.--Unusually hot and dry weather in the Rio Grande Valley during August retarded the development of citrus fruits to some extent. Many growers have had to irrigate at a time when irrigation is usually not necessary. In spite of this dry weather, the fruit is holding well and indications point to another season of heavy production.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Classified American wheats show wide range of resistance and susceptibility to hessian fly in California.--W. B. Cartwright, of the Sacramento, Calif., laboratory, reports that the classified American wheats are offering unlimited opportunities for studies on inheritance of resistance to the hessian fly in California, reacting as they do through a range of high resistance to high susceptibility. The present studies are limited to those varieties with low plant infestations and low populations, although significant differences are recognized in average fly populations between varieties having high plant infestations. A high degree of resistance is recorded in the field tests of 1937 in the varieties Baldrock, Berkeley Rock, Dawson, Honor, Nabob, Red Clawson, and Wheedling; consistently low infestations in Prohibition, Leap, Harvest Queen, Prosperity, Marquillo, Penquite, Oregon Zimmerman, Dixon, Genessee Giant, Mediterranean, Kawvale, Farward, and Java; and an intermediate degree of infestation in some varieties of the Blackhull group and other Crimean wheats. The variety Sol is conspicuously susceptible. In 1937 it was 100 percent infested in unit plant samples and sustained a population exceeding 75 flaxseeds per plant. In comparison, other susceptible varieties, as Squarehead Master, sustained 40 flaxseeds, Red Russian 30, Wilhelmina 15, and many others lower. Fifty-four varieties, or approximately 25 percent, of the common classified wheats had plant infestations below 80 percent, although this series of varieties decreases in number with more critical field testing in the special fly nurseries. The tests of 1936-37 indicate that resistance is limited neither to early or late wheats nor to winter or spring types for fly resistance, and a selected few of these have been chosen for the study of inheritance of resistance, the behavior of genotypes, and their reactions with varying or successive plant growths.

Hessian fly resistance of Dawson wheat bred through three backcrosses to susceptible varieties Poso and Big Club.--Mr. Cartwright also reports that in the field tests of 1937, involving 483 hybrid families, there are positive indications that the resistance of Dawson wheat has been successfully transmitted to the third backcross to susceptible Poso and Big Club. There is no indication that this resistance, in its accumulated two-factor condition, has been weakened by the three successive backcrosses. Single-factor lines derived from the crosses have segregated in regular order, and several have resistance approaching that of Dawson.

Changes of reactionary system of some wheat varieties to hessian fly, made by varying seeding dates in California.--Mr. Cartwright reports that a fall seeding and a spring seeding were made of 100 wheat varieties for the spring 1937 tests on hessian fly. Several resistant varieties, as Dawson, Prohibition, Prosperity, Baldrock, Red Clawson, Nabob, Wisconsin 18.4, T. N. 1006, and Berkeley Rock, remained unchanged in their reactions to the fly; while several varieties showed, significantly, differences in plant infestations for the two seedings. As a whole, the spring seeding was more heavily infested than the fall seeding, as evidenced in some examples given in the following table.

Variety	Infestation	
	November seeded	March seeded
	Percent	Percent
Lofthouse	50	93
Fulhio	18	90
Flint (Red May)	23	76
Huston	18	80
Michikof	67	90
Rural New Yorker, No. 6	0	20
Illini Chief	0	20
Red Chief	44	100
Blackhull	33	58
Superhard	33	60
Ioturk	46	38
Kanred	33	60
Nebraska No. 60	75	93
Red Rock	0	50
Purdue No. 1	3	34

European corn borer infestation in potatoes.--A. M. Vance, of the Toledo, Ohio, laboratory, reports that a survey of infestation by the first-generation corn borer in Irish potatoes was conducted by N. J. Nerney during the last 2 weeks of July, on eastern Long Island, N. Y., in central Connecticut, and in west-central Massachusetts. A large part of the last two regions lie in the Connecticut River Valley. In each of the three regions, 25 fields of potatoes, taken at random, were examined according to tested survey methods. The data obtained are summarized by region in the following table. Similar surveys in potatoes were conducted on eastern Long Island in 1932, 1933, 1934, and 1935, and the average numbers of borers per 100 plants for these years were determined as 22.8, 64, 48.7, and 30.1, respectively. In 1937 the average number of borers per 100 plants in the same region was 60. Potatoes in central Connecticut and west-central Massachusetts have not been surveyed previously for corn borer infestation. In the former region the average number of borers per 100 plants in 1937 was 106.2, and in the latter, 73.5. Although the two fields with the highest borer populations (580 and 400 per 100 plants) were found in Massachusetts, there were practically twice as many fields with an average of over 100 borers per 100 plants in Connecticut as in either the Massachusetts or Long Island regions. Both on Long Island and in Connecticut 88 percent of the fields surveyed showed infestation by the corn borer as compared with 56 percent of the fields in Massachusetts. The maximum number of borers found in a single potato plant in 1937 was 12. The data are tabulated in the order of planting date but are too limited for any interpretation of differences in infestation due to this factor. Planting of potatoes was earlier on Long Island than in Connecticut and Massachusetts and the average size of the fields was much larger there than in the other two regions. Although the data on the two common varieties of potatoes, Irish Cobbler and Green Mountain, have been separated in the accompanying table, no real differences in their susceptibility to the corn borer can be shown because of the distribution of the fields in relation to the abundance of the corn borer. It is apparent, however, on the basis of this survey, that both varieties were attacked by the first generation of the borer to about the same extent.

Summary of data on corn borer infestation in potatoes, Long Island,
N. Y., Connecticut, and Massachusetts, 1937

Region	Period of survey	Fields	Average plants infested	Average borers per 100 plants	Fields infested by borer	Fields with average of over 100 borers per 100 plants
		Number	Percent	Number	Percent	Percent
Eastern Long Island, N.Y.	July 17-21	25	30.3	60.0	38.0	24.0
Central Connecticut	July 22-27	25	48.4	106.2	88.0	44.0
West-central Massachusetts	July 27-31	25	23.5	73.5	56.0	20.0

Midsummer pupation of the European corn borer near Toledo, Ohio, in 1937.-- Mr. Vance also reports that the first midsummer pupation in 1937 near Toledo, Ohio, was found in a field of early sweet corn on July 20. On this date a total of 10 pupae were dissected from the more mature plants in the field, representing a pupation of 3.3 percent among 329 individuals so observed. All of the pupae appeared to have been formed recently, and several of them had not darkened in color. Since no pupae were found in the same field on July 14, it is concluded that the earliest pupation in 1937 occurred during the third week of July, at about the same time as in 1936.

Generations of the European corn borer on the Eastern Shore of Virginia.--D. W. Jones, Onley, Va., reports the development of three definitely demarked generations of the corn borer on the Eastern Shore this year, the first generation being confined almost exclusively to potatoes, and subsequent development occurring on corn. Moth emergence from second-generation larvae developed rapidly after the middle of August, with third-generation eggs being deposited in great numbers by August 19, thus allowing ample time for completion of the third generation under the conditions of the Eastern Shore environment.

JAPANESE BEETLE CONTROL

Farm-products inspection past peak.--By the end of the month fumigation of refrigerator cars was no longer required at most inspection points in the regulated area. At Philadelphia, 576 refrigerator cars were prefumigated during August. Inspectors stationed at New York City fumigated a total of 2,656 empty cars from July 6 to August 31. A general decline in shipments of farm products from the regulated zone was noted in all areas after the peak in July. Shipments of sweetpotatoes, however, centering at Pocomoke and Salisbury, Md., were increasing, inspectors certifying 151 cars and 2 truck loads during the month. Bulk shipments of watermelons were also increasing in the Maryland area. Bean machines stationed at Salisbury, Md., ran on an average of 135 hours each, at times running 10 to 12 hours at one stretch. Considering the hard usage to which the motors were subjected, their performance was very satisfactory. At Fredericksburg, Va., 95 live beetles were removed from 100,000 packages inspected during the month. In the same period, 85 live beetles were removed from produce inspected in the Washington area. In the Trenton, N. J., area, 16 cars of produce and 7 empty cars were fumigated with HCN during the month.

Seasonal scouting of establishments nearing completion.--Classified nurseries and greenhouses in the regulated zones were scouted from four to six times during the 1937 scouting season. Infestations discovered on six sand, soil, and manure establishments about Hagerstown, Md., indicate that shipments of such products will require close supervision. Rescouting of two classified establishments in the Richmond, Va., area, supposedly free of the pest, resulted in a find of six beetles at one. Fifteen commercial and noncommercial nurseries and greenhouses in the New England sector were found to have the pest present on or within 500 feet of their premises. In the Philadelphia, Pa., area, beetles were discovered on the premises of certified greenhouses in greater numbers than ever before. Several new infestations were found at nurseries in the southeastern and northern parts of the Philadelphia area. Infestations were building up rapidly in eastern Pennsylvania, particularly in orchards. The first shipment of evergreens for the season was reported from Mineola, N. Y., during the week of August 16. Many beetles are still to be found in this section.

Trucking of uncertified southern-grown produce discovered.--An inspector stationed at the public market in Rochester, N. Y., reported over 20 violations by truckers of the farm products quarantine. Farm products obtained in the regulated zone in Delaware, southern New Jersey, and Maryland, and trucked to nonregulated points in New York State, made up the bulk of the interceptions. Interceptions of uncertified produce in intrastate transit from regulated to nonregulated zones were reported by inspectors stationed at Syracuse and Elmira, N. Y. Preparations are now being made for the prosecution of the violators.

Intercepted load of manure held 48 hours for fumigation.--Interception of a truck loaded with over 13 tons of uncertified chicken manure obtained at Baltimore, Md., was reported by an inspector stationed at road-patrol station No. 20 on U. S. Route No. 1, south of Fredericksburg, Va. The entire load of manure was driven to the outskirts of Richmond and fumigated with carbon disulphide. After forty-eight hours, the truck was released, and proceeded to its destination, Beaufort, S. C.

Trapping activities drawing to a close.--With the lifting during the month of traps set in 111 communities in 10 northern and western States, there remained in operation traps set in 89 towns and cities in 11 States. Trapping was slightly extended during August by the setting of traps in 23 additional localities in 6 States.

Experimental activities in cooperation with the Division of Control Investigations.--Experiments with methyl bromide as a fumigant for carlots of green beans and potatoes were continued in cooperation with the Division of Control Investigations. Temperature trials to test the efficacy of HCN as a fumigant were conducted in the Jersey City railroad yards. Application of the fumigant in precooled cars was by the discoid method. Large quantities of beetles were collected for use in these experiments.

National Park Service plans treating program at Wakefield, Va.--Approximately 13 acres are to be treated with arsenate of lead in the Wakefield, Va., infested area. A conservative estimate of beetles caught at this point has been placed at 7,000. Information and suggestions have been forwarded by the Bureau to the National Park Service, which is undertaking the control work.

Dead beetles interfere with fishermen.--Large numbers of dead beetles washed ashore from the Delaware River, particularly below Chester, Pa., gave fishermen cause for complaint. They claimed that their catches were curtailed because the fish were surfeited with beetles.

Moth infestations heaviest in lumber shipments.--Increased gypsy moth infestation in the immediate vicinity of cutting crews made necessary piece-by-piece inspection of lumber shipments from Maine and New Hampshire. Throughout the 18 inspection districts, 63 egg clusters, 3 larvae, and 1 pupa were removed from 19 lumber shipments. Ten egg clusters, 3 larvae, and 1 pupa were removed from 6 shipments of logs, railroad ties, granite, and nursery stock. An inspector stationed at Westerly, R. I., collected 10,000 gypsy moth larvae for experimental work at the New Haven, Conn., laboratory.

English elm succumbs in spite of "guaranteed" treatment.--Reconfirmation of a 27-inch English elm in the Moravian Cemetery at Dongan, Staten Island, N. Y., has finally convinced the owners, the United Brethren Church, that the tree has Dutch elm disease, and has gained their consent to its removal. This is one of a large number of trees treated annually since 1935 on the cemetery grounds by a practical tree worker who makes use of an injection method which he guarantees will protect trees from, and cure trees of, Dutch elm and other tree diseases. Before the present confirmation, no diseased trees have been found on this property since the summer of 1934, and the absence of disease has been general throughout the immediate vicinity of the cemetery.

Present status of scouting in the major work area.--Scouting of the tri-State infected area and protective zone was approximately 86 percent complete in the first go-over by the end of the month. Over 50 percent of the same area has already been rescouted a second time, and a small fraction of the diseased territory has been scouted a third time. Of the 7,463 square miles which comprised the major work area at the beginning of August, there yet remains to be scouted approximately 950 square miles in the first scheduled go-over, 3,300 in the second go-over, and 7,100 in the third go-over.

Scouting in Pennsylvania.--Autogiro scouting is supplementing regular scouting on foot in an area of 730 square miles comprising the protective zone in Pennsylvania. A strip of territory along the Delaware River in Pike, Monroe, Northampton, and Bucks Counties, ranging in width from several hundred feet to approximately 1 mile, is scheduled to be scouted by crews on foot. An autogiro has been assigned to cover the rougher terrain in the western section of the work area. One of the three scheduled scoutings in the area assigned to foot crews was completed before the end of the month.

Confirmations increasing for town in Westchester County, N. Y.--Six trees confirmed during the first week in August in North Castle, Westchester County, N. Y., raised the 1937 total of trees confirmed in this town to 23. Diseased trees discovered in the past 3 years in the same locality numbered five, two, and seven, respectively. Piles of elm wood in the vicinity of the diseased elms may be the cause for the marked increase.

Revised instructions issued to scouts.--During the last of the three scheduled scouting surveys of the Dutch elm diseased work area, scouts have been instructed to sample only such trees as evidenced wilting or flagging associated with wilting, except where special conditions obtain. In some areas these same instructions have been given to scouts working on the second survey.

First case of Dutch elm disease at Athens, Ohio.--Upon confirmation, the first diseased tree found in Athens, Ohio, which is within the bounds of the southern Ohio Scolytus multistriatus infestation, was removed by an eradication crew early in the month. Located on the bank of the Little Hocking River, within 500 feet of the Baltimore & Ohio Railroad switch yards, the tree showed discoloration in the last three growth rings. About half the crown had died in 1936.

Importance of supervision demonstrated.--Systematic checking of the Indianapolis, Ind., W. P. A. scouts showed that, when working alone, they missed over 50 percent of the trees that should have been sampled. Under the surveillance of the Bureau's trained men and one State supervisor, scouting by the same men was more than 90 percent thorough.

Beetle-infested elm wood to be investigated.--Small wood, taken from elm trees and used by a farmer in Hunterdon County, N. J., as siding for a corn crib, was discovered to be heavily infested with beetles. Investigation is under way to determine whether the wood originated in chemically treated trees or was delivered on a fuel agreement.

Pandora moth larvae killed by solar heat.--In the pandora moth (*Coloradia pandora* Blake) outbreak on the Arapaho National Forest in Colorado, Mr. Beal reports that a heavy mortality occurred among the mature larvae as a result of solar heat. The mature larvae go into the ground to pupate and seek out soft spots where they can easily bore into the ground. These spots are usually free from duff and more often situated in little openings where they are exposed to the sun rays. Here many of the larvae were killed by the sun before they were able to bore into the ground, or were killed when pushed out of the ground by other larvae. These sun-baked larvae are elliptical in shape, not more than 1/2-inch long and 3/8-inch wide, appearing as greasy little pellets. They were shrunk from larvae 3 inches long and 3/8 of an inch thick. Although the ground is covered with dead sun-baked larvae, it is filled with living pupae which succeeded in getting into the soil in the larval stage.

Variations in emergence of Black Hills beetle.--During biological studies on the Black Hills beetle (*Dendroctonus ponderosae* Hopk.) by the Fort Collins, Colo., field laboratory, a wide difference was found in the time of peak emergence in different localities at the same elevations. At an elevation of 8,000 feet in southeastern Wyoming peak emergence occurred from limber pine during the last week in July. At the same elevation in central Colorado (200 miles south) peak emergence occurred from ponderosa pine the third week in August, or 3 weeks later than in Wyoming. It is not known yet whether this significant variation is due to host difference or to some peculiar climatic or seasonal variation in the two areas.

Spruce budworm causes severe losses in jack pine on the Superior National Forest in Minnesota.--Jack pine stands on certain parts of the La-Croix District of the Superior National Forest in Minnesota now show a high percentage of mortality as a result of an outbreak of the pine form of the spruce budworm in 1936. L. W. Orr, of the Milwaukee, Wis., laboratory, reports that a recent examination showed almost 100 percent loss of trees over 60 years of age, especially on poor sites. Almost every tree has been very heavily attacked by *Monochamus*, probably *M. scutellatus*. These borers have now rendered the dead trees practically worthless, except possibly for low-grade pulpwood. There has been relatively little attack by *Ips* bark beetles. The relative inaccessibility of the area has made salvage of the timber very difficult. Defoliation was less severe in younger stands, and sample plots are now being established in such stands to determine whether these weakened trees will recover or be attacked and killed by the tremendous population of *Monochamus* beetles which is expected in 1938. The losses resulting from this outbreak of the spruce budworm on jack pine have been much greater than have occurred in any of the other outbreak areas in the Lake States. It is believed that this is because of the poor site conditions and the extreme drought and heat which followed the defoliation in 1936.

Forest tent caterpillar causing mortality of trees in affected stands in Minnesota.--Mr. Orr also reports that most of the aspen and birch stands which have been defoliated by the forest tent caterpillar for two or more years now show considerable injury. In some areas very few trees have died but the tree crowns are thinning out as a result of the death of the smaller twigs and branches. In other areas many of the trees are dead and many have broken over. Practically all of the dead trees were heavily infested by the bronze birch borer before they died and a larger proportion of the trees which still appear to be alive are now infested by this borer. It therefore appears that there will be an almost complete loss of the aspen and birch in at least some of the affected areas. In mixed hardwood stands the defoliation has killed a large proportion of the overmature maple and oak. The results of the present outbreak of this insect are proving to be much more serious than were expected when the outbreak started.

Outbreak of Neodiprion lecontei in the upper peninsula of Michigan.--Lee E. Yeager, also of the Milwaukee, Wis., laboratory, reports a rather widespread outbreak of Leconte's sawfly in the eastern part of upper Michigan. Plantations and young natural reproduction of red and jack pine are affected. Trees up to 20 or 25 feet tall have been completely defoliated in some of the most heavily infested areas. Mr. Orr found this sawfly to be quite abundant in parts of upper Michigan in 1935 and 1936 and in lower Michigan in 1935. The extreme heat of the summer of 1936 resulted in almost complete mortality of the eggs and young larvae in lower Michigan in 1936, and Mr. Yeager has found only a very few larvae there this summer. However, there was less mortality in 1936 in upper Michigan and the insect seems to be increasing in abundance. Certain plantation areas were protected by spraying in 1936 and are being treated again this season.

White pine stands of northern Idaho being covered by Forest Insect Survey.--A 12-man crew is now engaged in making a survey of the white pine stands of the Coeur d'Alene, St. Joe, and Kaniksu National Forests for the purpose of determining the present status of the mountain pine beetle infestation. Mr. Evenden states that this survey was started on August 4 and is under the direct supervision of T. T. Terrell, of the Coeur d'Alene, Idaho, laboratory. This project will last until the early part of November, as the program will include the Weiser National Forest in southern Idaho, where a rather severe infestation of the western pine beetle in ponderosa pine exists.

Mountain pine beetle broods dependent upon intensity of attack.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, reports that the number of mountain pine beetle attacks per square foot of bark surface apparently has a decided effect upon the abundance of brood produced in western white pine trees. The following table shows some of the effects of intensity of attacks.

Attacks per square foot	Trees examined	Bark surface	Average per square foot of bark: Brood	Egg gallery per attack	Bark destroyed by other agents	Parasites	Predators
Number	Number	Sq. ft.	Number	Inches	Sq. in.	Number	Number
1-5	48	8,310	5.7	22	19.5	5.9	2.2
6-10	58	10,808	8.5	13	13.7	4.9	2.3
11-15	23	5,475	9.4	10	9.3	2.9	3.3
16 and over	4	724	7.3	6	10.9	2.6	0.5

Maximum brood is produced with 11 to 15 attacks per square foot. A lesser number of attacks provides a reduced potential in spite of the large length of egg gallery per attack, and a greater number of attacks causes overcrowding with a consequent higher mortality to the developing larvae. The optimum number of attacks apparently allows for the proper spacing of eggs, thus insuring sufficient food for each larva. It is interesting to note that more bark is destroyed by other agents, and parasites are more abundant in lighter-attacked trees, thus tending to utilize bark and destroy mountain pine beetle brood. These data were taken from brood examinations on the Coeur d'Alene National Forest and are perhaps indicative of conditions in this particular infestation only.

Mountain pine beetle increasing in sugar pine areas.--G. R. Struble, of the Berkeley, Calif., laboratory, reports that in the Sierra Nevada region of California the mountain pine beetle has shown more of an aggressive tendency this year than any year since 1933. At Mariposa Grove, in Yosemite National Park, a total of over 50 large mature sugar pines was killed within the past year. Twenty-five of these were felled by C. C. C. labor and treated by the solar heat method during June, July, and August 1937. In addition, 27 more trees containing broods of the preceding overwintering generation were felled and treated by burning. The majority of these trees were over 60 inches in diameter, DBH. In the cut-over areas of the Sierra National Forest near Signal Peak a total of 70 sugar pines was found to have been killed during the past year on an area of 1,600 acres. These are seed trees and reserve left after cutting. These totaled a loss of 47,430 board feet, which is a heavy drain considering that the area was cut-over 10 years ago and the reserve was left mainly to insure restocking of the area. Mr. Struble attributes the outbreak to heavy windfalls which occurred within the area during the winter of 1935-36 and served as a breeding ground for a large population of beetles. In addition to this factor there was found to be a relatively light population of the most important predator of the mountain pine beetle, Enoclerus sphegeus Lec.

Heavy flight of lodgepole pine needleminer in 1937.--Mr. Struble also states that every alternate year the lodgepole needleminer (Recurvaria milleri Busck) occurs in the adult stage and enters a brief period of flight. The last flight period occurred in 1935 and the moths were expected again in 1937. This season the flight started July 10 and subsided August 15, with the peak occurring between July 25 and August 10. The heaviest centers of infestation are found within the Tuolumne watershed of the Yosemite National Park. In a recent survey made by the National Park Service two areas were found where the defoliation caused by the needleminer is being followed by the mountain pine beetle, with the result that large areas of lodgepole pine are being rapidly turned into dead forests.

Conditions necessary for oviposition of Melanophila californica Van Dyke discovered at Hackamore field base.--The possible importance of Melanophila californica as a factor tending to increase the susceptibility of ponderosa pine to bark beetle attack led in 1936 to an intensive program of biological studies to determine the seasonal and life history of this insect. It was not until 1937, however, that the conditions necessary to successful oviposition of this species were discovered. K. A. Salman and A. S. West, who have been conducting these studies, report: "Emergence of M. californica and M. gentilis Lec. adults was practically completed during August, and that from many of the bark samples was very low probably due to the effects of molds that developed in storage and to abnormally low temperatures during the winter months. Bark containing prepupal larvae and pupae now is being removed from cold storage and exposed to normal temperatures. It is hoped this material will yield adults that can be used in experiments long after normal emergence has been completed. The forcing of attacks on logs in the presence of green branches and needles for food has been successful for both species of flatheads. This is true for both field-collected and reared material. Field-collected adults have lived in the forcing cages since July 2 (38 days), which extends the known length of adult life considerably. Eggs have been secured in large numbers. The largest number recorded as laid by one individual at one time of oviposition was 30. Groups of several eggs are commonly laid at one time and in one place. An egg parasite which has caused considerable mortality in the rearing material may be an important natural factor in the field."

Entomological factors important in experimental logging project.--The Blacks Mountain Experimental Logging Project, which will be carried on for the next 10 years by the Forest Service and the Bureau of Entomology and Plant Quarantine to determine methods of logging and management for preventing bark beetle damage, was started in May 1937. J. W. Bongberg, who has been conducting the entomological surveys in this area of 10,000 acres, gives the following report of progress: "Work has been continued on the points to be considered in determining the susceptibility of green trees. A tentative classification is being developed. An additional 50 trees have been classified and analyzed on the Fruit Growers Sale Area with satisfactory results. All merchantable trees in the stand on four compartments in the southwest portion of the Blacks Mountain Experimental Forest have been marked according to their susceptibility. The Experiment Station staff now is marking them for values and determining which ones shall be removed when logging starts around the middle of August. In addition, one compartment has been marked on which all and only susceptible trees will be logged this season. One other compartment has been assigned the Bureau for the same work but that will not be cut this season. The stands on the five compartments that are to remain untouched also have been classified."

Bark beetles on elms.--On July 29 W. D. Buchanan and R. T. Webber, of the Morristown, N. J., laboratory, made observations in Greenwich, Conn., at a point where an elm affected by the Dutch elm disease had previously been removed and where about two cords of elm wood from other trees were present in the yard of a dealer in firewood. They found that the larger logs had been or still were heavily infested with the bark beetles Scolytus multistriatus Marsham and Hylurgopinus rufipes (Eich.). Two elms which stood in the center of the woodpile had been severely injured by adults of S. multistriatus feeding in the twig crotches. The terminal shoots had been so badly girdled that the trees appeared to be dying when seen from a distance. Seven small branches were cut from the trees. Forty-five of the 90 twig crotches had open injuries in them and in addition 109 injuries occurred where small shoots had been cut off. Forty-nine living S. multistriatus adults were collected from crotches. Of these 28 were females and 21 were males. The fungus which causes the Dutch elm disease was isolated from two of the females and four of the males by the Morristown laboratory of the Division of Forest Pathology, U. S. Department of Agriculture.

Elm trees killed with copper salts.--R. R. Whitten, of the Morristown, N. J., laboratory, reports on tests having to do with the solubility of copper salts in elm trees. These were conducted in connection with experiments to determine how standing elm trees can be satisfactorily killed and rendered unsuitable for bark beetle attack. Six small living elm trees were cut off at the bases and the cut ends placed in containers of solution. Two of the containers held copper sulphate solution, two held copper chloride solution, and the remaining two held copper nitrate solution. After 24 hours the solutions had been absorbed by the trees and the foliage was entirely brown. Twenty-four hours later the trees were sampled by means of complete increment cores at 8-inch intervals for the entire length of the stem. The cores from each tree were numbered consecutively from the base upward. The outer one-half inch of the xylem from both ends of the cores was removed and cut into thin wafer sections and placed in test tubes. Samples bearing odd numbers received 20 cc of water and were placed in boiling water for 30 minutes. After standing for 12 hours they were tested for copper by the potassium iodide, sodium thiosulphate titration method. Samples bearing even numbers received the same treatment with the exception that 5 cc of glacial acetic acid was added to each sample as soon as it was removed from the water bath. In all cases the tests showed the presence of considerable copper in the samples to which glacial acetic acid was added, whereas only one of the other samples showed the presence of a small amount of copper. It is evident from these tests that when these copper salts are injected into living elm trees they become "fixed" or insoluble in hot water. Their distribution in an elm tree is, therefore, dependent on the activity of the tree while they are in solution and not on diffusion. It is also true that a rapid distribution is imperative since very small traces of copper slow up and eventually stop all activity in an elm tree.

Eastern spruce beetle control.--J. V. Schaffner, Jr., of the New Haven laboratory, reports on the seasonal development of *Dendroctonus piceaperda* Hopk. at Rochester, Vt., where a control project for this bark beetle is now under way on the Green Mountain National Forest: "During August all stages of *D. piceaperda* were noticed. Living adults and eggs from the overwintering brood were found as late as August 26. The first pupae of the 1937 brood were found very common in two trees on August 5. On August 9 one tree was noted which contained numerous pupae and a few freshly formed adults. August 26 a tree, 19 inches DBH, was cut down and examined. This tree had lost most of its foliage very recently due to the severe infestation. The examination disclosed infestation extended for 37 feet up the trunk, and the majority were fresh adults. Samples near base and at about 20 feet indicated an infestation of about 100 beetles per square foot. Experiments are being conducted to obtain data on the late summer and fall issuance of the brood and whether new attacks are made by this brood during the fall."

Parasites of European spruce sawfly liberated.--P. B. Dowden and P. A. Berry, of the New Haven, Conn., laboratory, report that the last half of August was spent in northern Maine liberating parasites of *Diprion polytomum* (Htg.) supplied by the Canadian parasite laboratory at Belleville, Ontario. The parasites were shipped directly to Mattawamkeag and Jackman, Maine. They were received in excellent condition and liberated as quickly as possible. Nearly a million parasites, most of them *Microplectron fuscipennis* Zett., have been liberated at nine points in northern Maine. Sample collections of from 300 to 1,000 *D. Polytomum* cocoons were made at each liberation point, and recovery collections of 1,000 cocoons were made at Portage, Masardis, and Presque Isle, Maine, where *M. fuscipennis* was liberated in 1936. *M. fuscipennis* has already issued from cocoons collected at Masardis and Presque Isle, showing the establishment of this parasite at these two points.

Matsucoccus survey in Pennsylvania.--Thaddeus J. Parr, of the New Haven, Conn., laboratory, reports on a brief survey of *Matsucoccus*-infested pine in Pennsylvania. At Snydersville damage continues to be extensive, some trees being dead, others dying, and others showing the first extensive killing of terminal growth this year. Scotch pine growing with branches interlaced with heavily infested pitch pine showed no infestation. Several hitherto unknown infestations were found around State College. A heavy infestation was inspected at Paradise Furnace C. C. C. Camp, 17-1/2 miles from Mapleton. Here, in a mixed plantation, the pitch pine are dying, and light infestations were found on table mountain pine, thought to be a new host record. At Mont Alto there is very severe damage to pitch pine in plantations, where extensive killing of current growth is showing on the larger trees for the first time this year. Shortleaf pine reproduction is also being rather severely damaged. It is thought that study plots should be located at some of these areas in Pennsylvania.

GYPSY AND BROWN-TAIL MOTH CONTROL

Sprout removal work correlated over entire infested area.--An employee of this activity has recently been designated to contact the field force engaged in gypsy moth sprout removal work. He spent the first week in August in the Pennsylvania area, inspecting the work of the crews and suggesting alterations in procedure designed to correlate the methods with those used in other sections. He is now visiting the sprout removal crews in the New England States.

Preparation of bait for assembling cage work completed.--The work of preparing the attractant material for gypsy moth assembling cages, to be used in the field during the summer of 1938, was completed on August 7. A total of 7,129 charges was obtained, which greatly exceeds the number prepared last year.

Moths recovered at assembling cages in New York.--Of 2,142 assembling cages set out in selected areas in New York State, 4 cages recovered 5 male gypsy moths. The recoveries were made in Southeast, Carmel, and Kent, all in Putnam County and within the limits of the barrier zone. The territory in the vicinity of the recovery cages will be scouted intensively to discover the infestations where the moths originated. No recoveries were made at the 984 cages set out in Pennsylvania nor at the 95 cages in New Jersey.

Shortage of eligible workers in Vermont and Connecticut.--A heavy crop of apples is expected this year in Vermont. Many orchardists have offered temporary employment in harvesting their crops to workers on this project, and very little gypsy moth field work will be accomplished in the fruit sections of the State during September and the first part of October. It will not be possible to scout with relief labor some of the territory in both States, where work is most needed, unless employment conditions change in the near future.

Deer and cattle aid sprout removal work.--Selective thinning work, which consists of cutting out trees and shrubs favorable for the development of the gypsy moth, is often done in heavily infested areas and in other selected locations. It is necessary to return to such areas in following years to remove sprouts which spring up from the stumps, in order to obtain full benefit from the thinning work. The sprout removal work will be unnecessary this season over a considerable area in Pennsylvania, as deer are so numerous and food so scarce in the region of Penn Forest and Buck Townships that the animals have fed upon the sprouts which developed in areas where the favorable food plants had been selectively thinned. A similar situation exists in several sections of Vermont, where the sprouts have been eaten by cattle in overstocked pastures in areas where the growth of the grass was retarded by lack of sufficient rainfall during the past 2 months.

Two infestations in northern Vermont apparently eliminated.--Intensive clean-up measures have been applied at the site of a gypsy moth infestation in the town of Derby, Vt., which is on the border of the Province of Quebec;

and at another infestation in Essex, Vt., about 35 miles south of the border. Burlap bands applied to trees at both infestations during June revealed no caterpillars, which indicates that both infestations have been eradicated.

Sawdust machine in use in the field.--The sawdust machine, used to dispose of brush cut during thinning work, is now in operation at the site of an infestation in Cummington, Mass. This machine reduces to sawdust brush which could not otherwise be disposed of during periods when it would be unsafe to do burning work, and eliminates the necessity of returning crews to such locations later in the year when the slash could be safely burned.

Fencing material inspected outside of quarantined area.--Dead chestnut trees have been cut in the vicinity of Warren, Conn., to be used by the Connecticut State Highway Department in the construction of fences along highways in the northeastern corner of the State. While Warren is not under quarantine, the trees are being cut near areas where small gypsy moth infestations have been found in previous years, and the lumber has been carefully inspected before movement from the lots.

Progress of work in New York.--Gypsy moth work continues at the sites of several isolated infestations, and also at other selected locations, in New York State. During the first part of August W. P. A. workers assigned to duty in Shawungunk, Ulster County, and in Putnam Valley, Putnam County, were engaged in thinning operations and in removing the loose bark from some of the large trees so that scouting can be done more easily and efficiently. The small force employed in Dutchess County is engaged in scouting in the region of the infestation discovered last year in Amenia Township; and another small force employed in Albany is scouting in the northwest corner of the town of Guilderland. No infestation has been found in the latter town.

Several isolated infestations in Pennsylvania apparently eliminated.--No gypsy moth larvae, pupae, or moths had been located up to the end of August at the sites of infestations discovered during the fiscal year 1937 in the townships of Ransom and Carbondale in Lackawanna County, or in Tunkhannock, Chestnut Hill, and Coolbaugh in Monroe County. It would appear, from the results already obtained, that these isolated infestations have been exterminated.

Artillery material inspected for the gypsy moth on Army Reservation.--A junk dealer in Carbondale Township, Pa., was recently awarded the contract to salvage shell-casings and shell-heads for junk purposes at the Army Reservation in Tobyhanna Township, where the National Guard and the Regular Army have been trained during the past 15 or more years. The weight of shell-casings and shell-heads used in artillery practice during this period is estimated to be 30 million pounds. Any of the material lying on top of the ground will have to be inspected before movement from the reservation to Carbondale is permitted, as four infestations have been found within the reservation.

Increase in C. C. C. gypsy moth employees.--The number of C. C. C. enrollees employed on gypsy moth work increased from an average of 705 during the week ended August 7 to 806 during the week ended August 21. During the first part of the month most of the men were employed in patrolling burlap bands and crushing gypsy moth caterpillars and pupae, in creosoting egg clusters and female moths, and in removing the burlap from areas where no gypsy moths were found. Later in the month the men removed the burlap from infested areas and were then employed in selective thinning work and in burning forest slash and debris.

C. C. C. gypsy moth field meeting.--A circular letter pertaining to the C. C. C. gypsy moth field meeting to be held on September 2 at the Westfield, Mass., C. C. C. Camp has been sent to the proper State officials with a request that they be forwarded to the gypsy moth foremen, superintendents, and any other officials who might be interested. The State officials in charge of gypsy moth work in Vermont, Massachusetts, Connecticut, and New York have also been invited to attend this meeting. Past work will be inspected and future work described and discussed.

Brown-tail moth summary.--From July 1, 1936, to June 30, 1937, Federal W. P. A. brown-tail moth crews cut and destroyed nearly 3,045,800 winter webs, nearly one-half of the total in New Hampshire; over 779,000 in Massachusetts, and 743,000 in Maine; nominal numbers in Rhode Island and Vermont; and none were found in Connecticut. Over 48,800 miles of roadsides were scouted--more than 15,000 in Maine and 12,000 in Massachusetts; nearly 13,000 in New Hampshire; and much smaller mileages in Vermont, Connecticut, and Rhode Island. More than 24,500,000 trees were examined--over 6,000,000 each in Maine, New Hampshire, and Vermont; 5,000,000 in Massachusetts; and under 400,000 in Connecticut and Rhode Island. Nearly 265,000 trees were cut, principally in New Hampshire, Maine, and Massachusetts. None were cut in Rhode Island or Connecticut. Browntail W. P. A. work was suspended on June 30, 1937.

PLANT DISEASE CONTROL

Blister rust found on Ribes in Trinity County, Calif.--On August 13 blister rust infections on *Ribes nevadense* and *R. cruentum* were located in Trinity County, Calif., in Township 29 North, Range 11 West. On August 19 two additional *Ribes* infections were found in this same township, also on *R. nevadense*, but several miles distant from the first infections. The distribution of infection on *Ribes* in this general locality strongly indicates the presence of infected pines nearby. This discovery of blister rust in Trinity County extends the known distribution of blister rust approximately 100 miles southward and places the present center some 117 miles south of the Oregon boundary, well within the sugar pine type of the coastal region of California. It is significant to note that one of the *Ribes* infections was found on a dry, rocky east-facing slope, subject to climatic and temperature conditions similar to those prevailing in the drier sections of the central Sierra region.

Blister rust infection on Pinus albicaulis on Mt. Hood.--Messrs. Martin and Benedict, of this Bureau, and Mr. Kummel, of the Forest Service, examined blister rust infection conditions on western white pine and on the white bark pine, Pinus albicaulis, in the Mt. Hood region of Oregon on July 9. Infection was general on western white pine at the lower elevations. P. albicaulis, which occurs at timber line on Mt. Hood at an elevation of about 6,500 feet, was found infected with blister rust and the cankers had just reached the fruiting stage. While a few of the blisters had broken and were disseminating spores, most of them were intact on July 9. It appeared from the condition of the cankers that the dispersion of aeciospores would take place throughout the month of July. On the other hand, the cankers on the infected western white pine at the lower elevations had dispersed all of their aeciospores prior to their examination on July 9. The fact that aeciospores were being produced so late in the season on P. albicaulis at the higher elevations showed that aeciospores in the Mt. Hood region would be dispersed from May until about the first of August, a much longer period than usual. The lateness of aeciospores production on P. albicaulis probably is due to the high elevation at which this species grows and the consequent backwardness of the season. Ribes bracteosum was observed along the stream beds on the lower slopes, and it was very heavily infected with the uredinial stage of the rust.

Control work started on Crater Lake National Park.--The National Park Service, in cooperation with the Bureau, is starting control work at Crater Lake, Oreg., to protect the Pinus albicaulis, which are of esthetic and scenic value around the rim of the lake. The principal Ribes is R. erythrocarpum, a trailing species that occurs in association with the pine. It usually requires some shade, occurring under the pines, and generally not in the open to any great extent. The work will be performed by labor assigned from C. C. C. camps on the National Park and will be under the technical direction of Mr. Wessela, who has charge of blister rust control work in Oregon. This year it is planned to work an area of about 1,200 acres to test the methods and practicability of removing the R. erythrocarpum under the field conditions found in the vicinity of the lake.

Ribes show little regeneration in Acadia National Park.--When control work was started at Acadia National Park, provision was made to conduct the activities so that definite information would be obtained on the cost and effectiveness of establishing and maintaining blister rust control under such mountainous conditions. A complete summarization of the data has not been made, but the following comparison of the results of initial and reeradication work in four of the control units indicates that the initial control work was very efficient.

LIBRARY
STATE PLANT BOARD

Comparison of results of initial and reeradication work

Block no.	Year worked		Acreage of block	Number *Ribes* pulled		Feet of live stem of *Ribes* pulled on reerad.	*Ribes* per acre	
	Initial	Reerad.		Initial	Reerad.		Initial	Reerad.
I	1930	1935	202	15,347	450	740	76.0	2.2
V	1930	1936	631	26,524	728	1,800	42.0	1.2
VI	1931	1936	668	31,131	3,891	689	46.6	5.8
VIII	1931	1936	748	25,151	2,251	1,126	33.6	3.0
Total	-	-	2,249	98,153	7,320	4,355	43.6	3.3

All of the initial control work in these four units was performed with regular labor, employed on cooperative funds, while the reeradication work was done by C. C. C. crews. Due to the differences in wage rates, no comparison has been made of the per-acre costs. An average of 43.6 *Ribes* bushes per acre were destroyed in these four units on the initial work. Only 3.3 bushes per acre were found when the areas were reexamined after a lapse of 5 to 6 years, and these *Ribes* averaged only about 7 inches of live stem per bush.

Salt treatment of barberry bushes in West Virginia proving effective.--Barberry eradication in West Virginia during the past summer has included a resurvey of certain areas covered in 1935 and 1936 to determine how much kill had resulted from previous work and to destroy any missed bushes, sprouts, and seedlings observed. The results have been most encouraging as to the effectiveness of salt for permanent barberry eradication. For example, a resurvey of two farms in Greenbrier County showed 94 new and sprouting bushes this season, whereas on the original survey 67,915 bushes and 1,075 seedlings were eradicated. The district leader also reports that all farms checked so far in Monroe County show a very high percentage of kill, many showing 100 percent. During the week ending August 4, 442 acres were covered on a resurvey and only 13 bushes found and destroyed, while on the original survey during the same week 200 acres were covered and 107,275 barberries killed.

Severe damage results from stem rust in certain parts of Indiana during 1937.--During 1937, Indiana farmers experienced the first serious epidemic of black stem rust caused by spores blown into the State from the South. Heretofore this source of rust spores has not been of commercial importance. The early source of stem rust spores has, in the past, been from the leaves of the common barberry, and whenever shriveling of the grain resulted from stem rust, it has been possible to find the common barberry bushes responsible for the early infection. Stem rust was first observed in Indiana this year near Lebanon, on June 7. Wheat in the extreme southwestern part of the State was in the late dough stage, and in the vicinity of Lafayette it was in the milk stage at that time. Field observations indicate that the rust blew into the southwestern part of the State earlier or in greater quantities than in the northern and eastern parts of the State. It is believed that there was a secondary spread of rust from the southwestern part of the State into the northern and eastern parts. The final result of stem rust in Indiana was quite variable. Most of the wheat in the southern third of the State matured before the rust caused serious damage. Yields were high and the quality good in this section of the State. Occasionally a field of very late wheat was found in this section which was damaged by the rust. Fields which were seeded very late after removing a crop of soybeans showed the heaviest damage. For the State as a whole, the most severe damage occurred in the west-central counties. On June 1 the Department of Agricultural Statistics at the Purdue University Agricultural Experiment Station forecasted a yield of 17.5 bushels per acre and a total production of 37,835,000 bushels of wheat for Indiana. This was before the rust made its appearance in the State. On July 1 the forecast was for a yield of 17 bushels per acre and a total production of 36,754,000 bushels. This was when the rust first appeared serious. On August 1 it was estimated that the yield per acre was 16 bushels and the total production was 34,592,000 bushels for the State. This was after most of the wheat had been harvested. The report on August 1 states, "The quality of grain is comparatively poor due to black rust infection. An area about four counties wide along the Wabash River from Vigo to Wabash Counties was worst affected." From the above figures it would appear that the yield had been cut from 10 to 15 percent for the State as a whole.

State Department of Agriculture in Pennsylvania takes active part in barberry eradication.--The Pennsylvania State Department of Agriculture approved the appointment of William O. Keim, effective August 1, 1937. Mr. Keim had been employed as an agent by the Bureau since August 20, 1935. He acted as assistant State leader since May 1, 1936. He has been assigned full time to barberry eradication to perform the duties required of an assistant State leader. The State Department has also allotted some funds, in addition to the salary and travel expenses for their representative, to be expended on the project for chemicals and miscellaneous supplies as the project may require. Farmers within the areas where barberry bushes have been destroyed are well pleased with the results of the control work. There was no stem rust damage to grain within the control areas in the State during the years 1936 and 1937. Numerous letters have been received from farmers who have benefited by these results. The farmers, in their letters and in personal contact with field representatives of the project, have quite generally expressed the fact that it was impossible to raise a respectable crop of wheat or oats before the barberry bushes were destroyed because of stem rust damage, but they have had exceptionally good grain crops with no rust damage since the bushes were destroyed. Local epidemics of stem rust occurred throughout the northern half of the State this year wherever barberry bushes were present.

Line marking and strip surveys.--In covering wooded, brushy, and open areas for the destruction of either currant and gooseberry plants, or barberry plants, various methods are used for keeping track of the strips worked by the crews. In the case of blister rust control the two methods which have been found adapted to the greatest varieties of conditions are either scattering waste paper or using string lines. The breaking of twigs of brush and other methods have also been employed. A report has just been received from the State barberry eradication leader of Ohio stating that in woodlands there, the use of a special line marker employing finely pulverized white lime has been found especially economical and adaptable. Rubber bags are made of heavy automobile inner tubes which have been cut into convenient lengths, one end vulcanized and the other end clamped to a wooden cross bar and handle. Several small holes are made through the tube so that lime may escape when given a tap against trunks of trees, fence posts, rocks, poles, bare clay banks, or other objects. Cloth bags made from sugar or salt sacks are also used with wire handles for carrying. Each end man carries a marker, an arrangement which reduces the tendency to stop each time the line shifts at the end of a strip. The marks can be seen for several days unless there are heavy rains, and are therefore useful for the supervisor in locating the crew and checking the area covered, as well as in aiding the crew in carrying out the work systematically. Recently, similar line markers made from canvas, with fine mesh screen about 3 inches square in one side, have been tried in two or three States and found fairly suitable for the purpose. The canvas bags are less expensive than the markers made from rubber tubing.

1937 rust data being analyzed.--In his report of September 3, E. C. Stakman, in charge of rust surveys, states: "Work now is under way to summarize the course of development of the rust epidemic of 1937, and to evaluate the factors contributing to its development. Data have been accumulated on which final loss estimates can be based. It is evident that the epidemic of 1937 was one of the most unusual on record. The source of the epidemic seems to be different, the area covered was different from what it has been for many years, and in the spring wheat region there was greater variation in rust development and damage done than for many years past. The principal reasons for this unusual variation in damage are date of sowing, local rainfall and temperature, and differences in varietal resistance. Despite very heavy rust infection, durum wheats and Ceres yielded well in some localities. One very notable feature of the epidemic is the fact that the damage to oats and rye was negligible except in the immediate vicinity of barberries. The progress so far made in barberry eradication saved the oats and rye over extensive areas this year, as weather conditions during the spring were very favorable for infection of barberries and dissemination of rust from them. By the end of August, identification of 390 uredial collections, comprising 505 isolates and 18 different races of Puccinia graminis tritici, has been completed. At the same time, 36 aecial collections, comprising 54 isolates and 14 races, have been identified. About 450 additional uredial collections and 16 aecial collections are now in process of identification. So far, race 56, which was so prevalent in 1935 and 1936, constitutes 47 percent of all of the isolates, and the percentage is still higher in certain regions. The prevalence of race 56 undoubtedly explains why Ceres was again so susceptible to rust in 1937, as it was in 1935. The relative paucity of race 36 probably explains in part at least why Thatcher withstood rust so well this year. This variety was rusted to an appreciable extent only in a few localities where it had been planted late. Furthermore, the races that attack durums heavily were not particularly numerous early in the season, and this undoubtedly accounts partly for the fact that durum wheats in general were not so heavily rusted early in the season as the bread wheats, and in many regions they never did become so heavily infected, although because of late maturity of durums there was opportunity for some of the races that attack them to multiply and eventually cause heavy rust."

COTTON INSECT INVESTIGATIONS

Chlorochroa ligata (Say) reared on cotton.--T. P. Cassidy and T. C. Barber report that at Mesa, Ariz., adults of the "Conchuela", *Chlorochroa ligata*, collected in alfalfa fields, deposited eggs on cotton in cages and by the end of August some of the nymphs were in the third or fourth instars. The adults of this species have been observed in small numbers on cotton in Arizona for several years, and if numerous would cause as much damage to cotton as the more abundant *Euschistus impictiventris* Stal and *Chlorochroa sayi* Stal. As collection records for several years show that no nymphs and comparatively few adults of this species have been taken on cotton, it is evident that under Arizona conditions it does not naturally breed on cotton.

Insecticide tests against cotton flea hoppers.--K. P. Ewing and R. L. McGarr, Port Lavaca, Tex., report concerning toxicity tests in which 10 insecticides or mixtures were used against the cotton flea hopper, *Psallus seriatus* Reut. These tests were commenced on July 24 and were completed on August 7. An average of 265 adults and 213 nymphs were used with each insecticide. In all of these cage tests 2,645 adults and 2,126 nymphs were used. The insecticides used and the average percent mortality obtained in the cage tests were as follows: 10 percent paris green-90 percent sulphur, 87.7; 7.5 percent paris green-92.5 percent sulphur, 76.7; 20 percent cryolite-80 percent sulphur, 67.9; 20 percent calcium arsenate-80 percent sulphur, 62.4; sulphur, 60.0; 33.33 percent calcium arsenate-66.67 percent sulphur, 59.4; 50 percent calcium arsenate-50 percent sulphur, 56.5; fuller's earth-white arsenic (97-3 mix?), 46.9; calcium arsenate, 34.7; and 97 percent lime-3 percent white arsenic, 16.2. These insecticides or mixtures were also used under field conditions in Latin-square tests, 1-acre field plot tests, and in large-scale dusting experiments, but the results have not yet been obtained.

Parasites of the cotton flea hopper (Psallus seriatus Reut.).--K. P. Ewing and H. J. Crawford, Port Lavaca, Tex., report that the percentage of parasitization of cotton flea hopper eggs by *Erythmelus* n. sp. (Mymaridae) in 13 collections of *Croton* sp., cotton, *Solanum elaeagnifolium*, and *S. rostratum* was 29.1 percent. Parasitization on cotton was 36 percent. The highest parasitization was 55.5 percent, on *Croton monanthogymus*. A possible reason for a higher parasitization on this plant is that the bark is comparatively thin with a tough stem. This causes the eggs to be placed near the surface. The pubescence on this plant is shorter than on *C. capitatus*. *Anaphes anomocerus* (Mymaridae) did not emerge from these 13 collections but emerged from bitterweed. Two *Erythmelus* n. sp. were reared on clean plants that were caged with flea hoppers for oviposition. These parasites spent 10 to 12 days in the egg of the cotton flea hopper. The flea hopper eggs were 1 to 3 days old at the time of oviposition by the parasites. *Erythmelus* n. sp. were observed to copulate soon after they emerged. Orius sp. (Anthocoridae) were observed feeding on Eyrthmelus n. sp. in the vials of the emergence cages.

Insecticide tests for hemipterous insects in Arizona.--T. P. Cassidy and T. C. Barber report the results of the insecticide tests at Mesa, Ariz., in which a Latin square of 36 plots was used. On August 11 a second series of form counts on 900 plants was made by counting all the fruiting forms on 25 plants in each of the 36 plots. The extremes in the plots varied from an average of 28.33 to 31.23 forms per plant. This small range of forms per plant indicates the uniformity of the plots and also the light insect infestation. This light infestation was also shown by population counts made on July 16, August 13-14, and August 26. These counts were made by making 50 strokes with a standard net in each plot, or 1,800 strokes in the 36 plots. In the first series of counts made on July 16, 389 specimens of hemipterous insects were taken, in the second series the number dropped to 198 specimens, and in the third series only 187 were collected. The lightness of the infestation is also emphasized by the fact that most of the hemipterous insects collected were Geocoris spp. (271, 157, and 122 respectively in the 3 series) which are mainly predaceous. On August 24 the percentage of bolls punctured in the various plots was superficially determined by examining 25 bolls in each plot. Of these 900 bolls, only 97, or 10.8 percent, were punctured by insects. The extremes ranged from an average of 8 percent punctured bolls in the six plots dusted with paris green 5 percent-sulphur 95 percent, to 16 percent punctured bolls in the untreated check plots. In a second series of experiments at Mesa in which four large plots were used, observations made during July and August indicate that conditions were almost identical with those in the Latin-square plots. In these plots the average number of forms per plant on 400 plants examined on August 12 was 29.9, as compared with an average of 30.07 forms on the plants in the Latin square. The insect collections in the two series of plots were almost identical. In this test on August 23, 400 bolls (100 from each plot) were examined both externally and internally. The calcium-arsenate treated plot had 5 percent punctured bolls, the sulphur treated plot had 9 percent punctured bolls, while the two untreated check plots had 9 percent and 13 percent punctured bolls. These records indicate that control from the use of calcium arsenate was noticeable even though the insect infestation was very light. In a third series of experiments conducted at Buckeye, Ariz., nine field plots of approximately 3 acres each were used. Six were dusted at 7-day intervals with different insecticides, using a five-row power duster for making the applications. The cotton on these 27 acres averaged more forms per plant than in the two fields at Mesa, and the hemipterous insects were also more abundant. On August 4-7 all forms were counted on 300 plants in each of the 9 plots. On the 2,700 plants there was an average of 35.47 forms. In the 6 plots treated with insecticides the average was 37.26 forms per plant, while the average of the 3 untreated check plots was 31.9 forms. The leading plot, dusted with calcium arsenate 20 percent-sulphur 80 percent, had an average of 48.11 forms per plant; the calcium arsenate plot was second with 42.83 forms per plant, and an untreated check plot was last with an average of 20.64 forms per plant. On August 9, collections were made by making 300 strokes in each of the 9 plots. In the 2,700 strokes of a net, 1,283 hemipterous insects, or an average of 47.52 per

100 strokes, were collected. This was almost half the number collected in these plots in July when the first series of collections were made. Little change was apparent in the number of pentatomids present, but the Lygus spp. collections had been reduced from 44.3 per 100 strokes in July to 12.9 per 100 strokes in August. All six of the insecticide treated plots had smaller insect populations than any of the three check plots. The most striking change in relative position of the plots was in the case of the calcium-arsenate treated plot which jumped from ninth or last position in the July counts to first place in the August counts. The second boll examination was made August 16-18 when 300 bolls were taken from each plot. This examination followed the fifth application of insecticides to the treated plots. Of the 2,700 bolls examined, 31.37 percent were punctured by insects. The average in the six treated plots was 26.1 percent, and in the three untreated plots was 41.87 percent. Compared with the July examination, the percentage of punctures in the treated plots was reduced 1 percent while in the check plots it had increased 10 percent. As the treated plots also averaged six more forms per plant than the untreated checks, the indications are that in this test larger yields of cleaner cotton should result from the use of insecticides.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Supervision of regulatory measures.--The ginning of the 1937 cotton crop in the lower Rio Grande Valley district of Texas was in full swing throughout August. By the end of the month 138,000 bales had been ginned for the season and it was estimated that there will probably be about 2,000 more bales. The heavy ginning naturally kept all of the processing plants operating at full capacity. During the first few days of September a number of gins began closing for the season, and as each gin closes it is being given a thorough cleaning. In the other regulated districts the installation of new equipment and the repairing of equipment previously used has been continued. During the latter part of the month there was some ginning in all of the districts, and after a few minor adjustments had been made the equipment operated quite satisfactorily. Reports indicate that if pickers are available ginning will soon be in full swing in all districts.

Destruction of stalks.--One of the measures to be used in controlling the pink bollworm infestation in the lower Rio Grande Valley is the cutting or plowing up of cotton stalks after picking is completed so that there will be no further growth. State regulations require that this be done by the first of October. With the slacking up of ginning inspectors in this district are having more time to devote to the destruction of stalks. In Willacy County it is reported that from 85 to 90 percent of the fields are in the process of being plowed. The percentage is slightly lower in other parts of the valley, but at the same time the progress being made is very encouraging. In some instances it is reported that the ground is too dry for plowing, but it will be begun as soon as there is sufficient moisture. The destruction of stalks is being done by the farmers.

Road-traffic inspection.--The road-inspection station on the principal highway leading out of the lower Rio Grande Valley was in operation throughout the month, and approximately 14,500 cars were inspected and some 250 confiscations made. The confiscations continue to consist largely of small lots of seed cotton in the possession of pickers and other lots being carried as souvenirs. What is believed to be a record in road-station inspection was made on August 22, on which day approximately 3,000 cotton pickers were checked through the station. Most of these pickers were being moved in large trucks carrying from 30 to 50 people, and practically all of them carried their own pick sacks. Truck drivers are aware of the fact that when the sacks are fouled with cotton products much time is lost at the station; consequently they have been seeing that the sacks were cleaned by the pickers before leaving the area. This saves the truck drivers much time and also makes the work of our inspectors considerably easier.

Gin-trash inspection.--Gin-trash inspection was carried on throughout the month by from 10 to 12 crews. Inspections were made in the lower Rio Grande Valley district and in the cotton areas to the north and east. In the regulated area inspections were completed. Over 5,000 bushels of trash were examined and 23 specimens of the pink bollworm found. Of this number 1 was from Hidalgo County and 22 from Cameron County. It is of interest to note that inspections in the Corpus Christi section of Texas have been completed with negative results. Considerably more trash was inspected there this year than ever before, and it would seem that we could now feel assured that no infestation resulted from bringing in valley products prior to the discovery of the infestation in 1936. As the ginning season advances the inspection crews will be moved on up through central Texas. Gin-trash inspections were completed in the State of Tamaulipas, Mexico, which is opposite the lower Rio Grande district of Texas. Inspections were also made in the State of Nuevo Leon. A total of 2,363 bushels of trash was inspected in these two States and 660 specimens of the pink bollworm found, all of these being from Matamoros, just across the river from Brownsville, Tex. Early in July worms were found at Matamoros at the rate of 1.17 per bushel. About the middle of August some additional inspection was done to see whether or not there had been an increase in infestation. From 60 bushels of trash inspected 322 specimens of the pink bollworm were found, which is at the rate of almost 5½ worms per bushel. It will thus be seen that the infestation built up considerably in a little over a month's time.

Laboratory inspection.--The inspection of material at the San Antonio laboratory was completed the latter part of July. During August a small amount of material was inspected at several of the field stations with negative results. Practically all material collected from the 1936 crop has now been inspected. At Miami, Fla., wild cotton bolls were inspected, 12 specimens of the pink bollworm having been found in the 4,886 bolls inspected. All of these came from Lower Matecumbe Key. This work has been completed.

Thurberia-plant eradication.--The destruction of Thurberia plants went forward throughout the month, with practically all of the work being devoted to a recleaning in both the Tortillita and Santa Catalina Ranges of southern Arizona. In the Tortillita Range more than 2,000 acres were gone over and only 138 seedling plants found. In the Santa Catalina Range 640 acres were gone over and 24,912 Thurberia plants destroyed. It is of interest to note that practically all of these were plants which had come up since the previous cleaning. Just at the close of the month a very good supply of water began coming down the canyons in the Santa Catalina Range, and plans are being made to establish a new camp at once. It is estimated that this new camp site can be used for at least 2 months, as it will be in the center of several sections of land where many Thurberia plants are believed to occur. It has been necessary to construct 9 miles of new trail leading to this new camp, and a telephone line has also been installed so that constant communication can be maintained.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Paris green and hydrated lime effective against hornworms on disease-resistant types of shade-grown tobacco of Florida.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that it has been determined that a mixture of paris green and hydrated lime in proportions of 1-6, by weight, may be applied to disease-resistant types of shade-grown tobacco at the rate of approximately 4 pounds per acre without appreciable discoloration of the cured product, and that such treatment functions as a satisfactory control of the tobacco hornworms Protoparce sexta Johan. and P. quinquemaculata Haw., if the larvae have not passed the third instar, and provided that the treatment is applied by the so-called "drift" method, whereby the dust is directed between the rows and permitted to drift over the plants. This mixture will also assist in controlling the tobacco budworm but cannot be relied upon to wholly control this pest. The paris green-hydrated lime dust mixture has the advantage of permitting a more uniform application and a lower quantity of paris green is required than when the undiluted material is used.

Relation shown between alfalfa culture and subsequent wireworm infestation.--E. W. Jones, of the Walla Walla, Wash., laboratory, reports that examinations of a potato field and an onion field in a plot where a 5-year-old alfalfa stand was plowed under and planted to truck crops in the spring of 1937 revealed that in the potato plot the population of the Pacific coast wireworm was less than 1 wireworm per square foot and that less than 4 percent damage was caused to a crop of early potatoes, whereas in the onion plot the population averaged approximately 1.3 wireworms per square foot and that this population caused a damage of approximately 11 percent. This observation corroborates previous evidence to the effect that truck crops may be grown with the expectation of only slight injury on land where alfalfa has been plowed under recently. The wireworm population in this field has been determined annually since 1930. Corn was planted in this field during 1930 and 1931 and was damaged severely by wireworms, which averaged eight per square foot. After 5 years of alfalfa, the population of this field was reduced to approximately one wireworm per square foot, on an average.

Dusts containing rotenone or pyrethrum not effective against adults of the cigarette beetle.--W. D. Reed and D. W. Hookom, of the Richmond, Va., laboratory, report that none of the dust mixtures containing rotenone or pyrethrum had a deleterious effect on adults of the cigarette beetle when directed against these insects in tests simulating conditions which would be encountered in tobacco warehouses. In the instance of the dust mixtures containing rotenone, there was no appreciable difference between the percentage of mortality achieved against the treated insects and those in the checks. Pyrethrum dust mixtures containing a high percentage of pyrethrins were slightly more effective than the rotenone-containing dust mixtures, but in no instance did the pyrethrum compounds give a percentage of kill which would be satisfactory in practical operations against the cigarette beetle adults in tobacco warehouses.

Pea weevil parasites liberated at Moscow, Idaho.--T. A. Brindley, of the Moscow, Idaho, laboratory, reports that a total of 20,480 adults of the pea weevil parasite Triaspis thoracicus Curtis were received at Moscow, during the month of July, and liberated in the field under conditions that would appear favorable for this parasite to become established. These parasites originated in Europe and were furnished through the cooperation of the Division of Foreign Parasite Introduction. The parasite material was shipped to Moorestown, N. J., reared at that point, and reshipped to Moscow through the cooperation of the Division of Cereal and Forage Insect Investigations. The insects were received at Moscow in excellent condition, with a mortality of only 5.7 percent. Releases were made in two situations.

Control of greenhouse mealybug on Saintpaulia.--C. A. Weigel and F. F. Smith, of the Beltsville, Md., laboratory, report that satisfactory control of the greenhouse mealybug (Pseudococcus citri Risso) on Saintpaulia plants has been obtained in recent experiments by dipping them in one of several solutions including the following: (1) An aliphatic thiocyanate at a dilution of 1-300 with a light oil (0.5 percent) added as a spreader, (2) a lauryl thiocyanate diluted 1-600 without a spreader, and (3) a mixed thiocyanate containing lauryl, octyl, decyl, and myristal alcohols (1-600 or 1-300) plus a light oil spreader (0.5 percent), or with an alkylphenylbenzene-sulfonic acid (1-300) used as a spreader. Since some temporary plant injury resulted at the 1-300 dilutions of the primary insecticides, it appears safer to use the 1-600 dilution with the light oil spreader. Infested Saintpaulia plants fumigated in a chamber at the rate of 2 ounces of calcium cyanide to 1,000 cubic feet resulted in a 98-percent kill of P. citri nymphs and adults, but the eggs survived. In other tests where the plants were subjected to two exposures with a dosage of 1½ ounces and another at 1 ounce, respectively, a high mortality of the nymphs and adults was obtained. These fumigations caused severe temporary injury to some of the treated plants, but such injury was outgrown eventually and the plants flowered freely. Based upon these experiments it appears that the successful fumigation of Saintpaulia plants for P. citri would require several treatments at intervals of approximately 1 week.

Epsom salt valueless as control for Mexican bean beetle.--A recent article in a scientific periodical indicated that magnesium sulphate (Epsom salt) used as a spray, in the proper concentration, constitutes an effective control of the Mexican bean beetle. Although experiments performed by N. F. Howard of the Columbus, Ohio, laboratory, in 1928 had demonstrated that this material was not toxic to the Mexican bean beetle, it seemed desirable to repeat these tests during 1937, since many inquiries were being received regarding the status of Epsom salt as an insecticide. Laboratory tests with *E. varivestis* larvae performed by R. A. Fulton at Columbus, using dilutions of Epsom salt 100 times as great as the lethal dosage of calcium arsenate, showed that the larvae fed on the treated bean foliage, that they consumed as much leaf area as the larvae placed on untreated foliage, that they molted successfully, and that there was no resulting mortality which could be attributed to Epsom salt.

Screening of tomato seedlings aids in preventing ravages of curly-top disease.--According to reports submitted by H. E. Dorst, of the Logan, Utah, laboratory, the placing of cheesecloth covers over tomato plants during the period of migration of the beet leafhopper has served to aid in protecting these plants against the subsequent development of the curly-top disease, sometimes known as the "Western yellow blight", which is transmitted by *Eutettix tenellus* Bak. Plots of tomatoes which were covered until June 12 showed only 15 percent of the plants affected by the disease, whereas tomatoes that were not protected and grown under comparable conditions were infected to the extent of approximately 40 percent. These plots were planted on May 1.

INSECTS AFFECTING MAN AND ANIMALS

Meadow mice excellent hosts for larvae of American dog tick.--Studies on the wild animal hosts of the American dog tick show that meadow mice (*Microtus* spp.) are well-adapted hosts of this parasite. In one instance 942 seed ticks completed engorgement on a single animal without fatal results. It is interesting to note that, on a rabbit infested with approximately the same number of seed ticks as the mouse and during the same period of time, only 28 ticks completed engorgement.

Cattle tick has variety of domestic animal hosts in Puerto Rico.--The following summary of collections of *Boophilus annulatus australis* Fuller from domestic animals during August 1937 by H. W. Tate in various localities in Puerto Rico indicates quite clearly that the treatment of livestock other than cattle must be considered in attempts to eradicate the tick on the island.

Type of animal	Locality	Animals	
		Examined	Infested with *Boophilus annulatus australis*
		Number	Number
Goat--------	Ponce	2	0
Do--------	Aguirre	6	1
Do--------	Guayama	14	1
Do--------	Juana Diaz	43	23
Sheep------	Aguirre	95	66
Do--------	Juana Diaz	70	2
Do--------	Juana Diaz	14	4
Do--------	Ponce	50	2
Horse------	Ponce	11	0
Do--------	Juana Diaz	10	0
Do--------	Juana Diaz	11	0
Dog---------	Mayaguez	16	7

Mosquito-eating fish show unusual hardiness.--H. H. Stage, of the Portland, Oreg., laboratory, reports that a stock of Gambusia planted in a heavily polluted pond in Multnomah County in 1935 have multiplied greatly. This is particularly interesting because of the abnormally low temperatures experienced in that section last winter. During February 1937 the pond was frozen for several days.

Oil-pyrethrum extract mixture appears to be good repellent for sandflies.--J. B. Hull, of the Savannah, Ga., laboratory, reports excellent results with a mixture of S.A.E. 10 lubricating oil and pyrethrum extract for keeping sandflies out of houses. The mixture is sprayed on the screens of doors and windows and retains its repellent value for several hours.

Norway rat important host of American dog tick.--Studies by C. N. Smith on the wild animal hosts of the American dog tick on Martha's Vineyard, Mass., indicate that the Norway rat is fairly commonly infested with the immature stages of the tick in that locality. The tick had been collected previously from this species of rat in other places but not in such large numbers as those found on the animals on Martha's Vineyard.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Six living larvae of the West Indian fruit fly (Anastrepha acidusa Walk.) were intercepted at San Juan, P. R., on May 19 in Malay apple (Eugenia malaccensis) in the mail from Dominican Republic. Five living larvae of the Mexican fruit fly were intercepted at New York on April 29 in a mango in baggage from Honduras. A living larva of Psylliodes chrysocephala L. was taken at New York on April 1 in the stem of white-sprouting broccoli (Brassica oleracea italica) in ship's stores from Italy, and two living larvae of this chrysomelid were also taken at New York on April 9 in a leaf stem of cauliflower in ship's stores from Italy. Living specimens of the scale insect Lepidosaphes (Coccomytilus) halli Green were found at Washington, D. C., on March 13, 1936, on apricot trees in the mail from Damascus, Syria. Living specimens of the thrips Frankliniella ingentissima Pr. arrived at the airport at Brownsville, Tex., on December 22, 1936, on gardenias in cargo from Mexico. J. C. Crawford reports this to be a first record. A living adult of Bruchus tristiculus Fahr. was intercepted at Mobile, Ala., on May 26 in a vetch seed in cargo from Hungary. Specimens of the scale insect Odonaspis ruthae Kot. arrived at Honolulu, Hawaii, on September 9, 1936, on a grass (Lepturus repens) in baggage from Christmas Island. Two living larvae of the yam weevil (Palaeopus costicollis Marsh.) were taken at Boston on June 7 in a sweetpotato in ship's stores from British Guiana. The scale insects Fiorinia japonica Kuw. and Poliaspis pini Mask. were found at Philadelphia on February 3 on dwarf pine trees in ship's furnishings and quarters from Japan. A living adult of the weevil Tetrabothynus spectabilis Boh. was intercepted at New Orleans on June 1 on a pineapple fruit in cargo from Cuba.

Fruit fly interceptions at Laredo.--A returning family arrived on the bridge at Laredo and declared they had no fruit or plants from Mexico. The inspector, while examining the car, picked up a paper bag from the floor and asked what it contained. The girl replied, "That is a little, old, dried-up peach--it don't amount to anything." The inspector took it up and continued to search the car, finding two oranges concealed in the dash compartment. The lady had a purse beside her on the seat and the said purse looked "too fat." The inspector asked what was in it. The lady replied, "Nothing--just the usual things." He then requested that she open it, which she did rather indignantly. It contained a mango. The usual fine of $1 was assessed by the customs official. Later, on examining this fruit, 1 fruit fly larva was taken from the peach, and 33 fruit fly larvae were taken from the mango. A couple from the State of Washington arrived on the bridge at Laredo, coming from Mexico. When asked if they had any fruits or plants, they declared six pineapples. The inspector found the 6 pineapples, also a bag containing 17 mangoes, which they had failed to declare, but no attempt had been made to conceal. The woman protested bitterly against giving up the mangoes, and insisted that she be allowed to eat them right then and there, which request was, of course, refused. Later 10 fruit fly larvae were taken from 3 of these 17 mangoes. The inspector in charge at the footbridge, on going to work one morning, found the following note on the bulletin board, left by the inspector on duty the night before: "I picked 110 fruit fly larvae out of 1 mamey--take a look." A family of tourists arrived on the bridge at Laredo--father, mother, and two small children--coming from Mexico. They were from one of the Northern States and had not heard very much about fruit fly damage or come in contact with fruit fly larvae. When the plant quarantine inspector took two nice oranges from the lunches they had purchased in Mexico, he explained that the fruit was the host of the Mexican fruit fly and was prohibited entry into the United States by Federal quarantine. They were nice about it and willing to give up their fruit, though they were a little bit hurt and felt that they were being imposed upon or taken advantage of, just why they did not fully understand. It so happened that one of the inspectors had just been relieved and was inside the office cutting up fruit that he had taken up. Among this fruit were two infested oranges from which he had just removed some fruit fly larvae, and five large, fat, wiggling larvae had been placed in a test tube preparatory to boiling. The inspector took these into the customs office, sought out the people from whom he had just taken the two oranges and showed the larvae to them, saying, "We just took up your two oranges. You were nice about giving them up, didn't object, but probably do not understand just why we took them. These larvae only a few minutes ago were taken from some oranges from Mexico. I thought you might like to see them in order that you may better understand why we do not let Mexican oranges come into the United States." The people were immediately interested, viewed the larvae, asked many questions about them, and thanked the inspector for showing the larvae to them and for taking their oranges away from them.

Pathological interceptions of interest.--Evidence pointing to wide distribution of Anguina tritici (Steinb.) Filipjev in northern China was found when 26 out of 111 samples of wheat from that source were found to be infested when inspected June 15 at Washington. Cercosporella albomaculans (E. & E.) Sacc. was intercepted May 19 at Seattle on cabbage from Japan. Glomerella cincta (Ston.) Spauld. & Schrank was intercepted on orchid leaves from Siam July 23 at New York. Our first interceptions of Hemileia oncidii Griff. and Maubl. were made at Washington, May 7, on Oncidium varicosum rogersii from a greenhouse in England and on May 11 and 12 on wild species of Oncidium from Brazil coming in under special permits. Phyllosticta codiaecola Died., first interception, was found at New York on Codiaeum cuttings in baggage from Bermuda. Sclerotium bataticola Taub. was found on sweetpotatoes from India April 2 at Washington. Urocystis occulta (Wallr.) Rab. was found on rye straw packing from Poland at New York. Our first interception of Uromyces loti Blytt was made at Washington January 27 on lotus from Turkey. U. trifolii (Hedw. F.) Lev., first interception, was found on clover leaves and stems in packing from Bermuda April 29 at New York.

DOMESTIC PLANT QUARANTINES

White-fringed beetle found in Mississippi.--The occurrence of the white-fringed beetle in Laurel, Miss., reported early in August, was found on investigation to represent a new center of infestation, more remote from the original center in the Alabama-Florida area than any yet found. The infested area covers approximately $1\frac{1}{2}$ square miles in the city of Laurel, in the vicinity of three railroad rights-of-way and a lumber yard. The limits of the infested area are believed to have been determined, two Federal inspectors and seven Mississippi State inspectors having carefully inspected this area including the highways and railroad rights-of-way for a considerable distance out of the city. Seventy-five percent of the beetles found were dead. It is difficult to find larvae, the inspectors report, and no pupae were found. Barrier ditches have been constructed in the city alleys, streets graded in the infested area, weeds and grass on roadsides and vacant lots burned by pressure burners, and railroad and industrial yards cleaned up.

White-fringed beetle situation in Alabama and Florida.--As a result of continued inspection for the white-fringed beetle with a force of 55 to 60 Federal and State inspectors in the region of the infested counties of Alabama and Florida, and the Gulf coast area, an infestation of the white-fringed beetle was found on railroad yards at Pensacola, Fla. One new infestation was also located at Laurel, Okaloosa County, Fla., a county in which the beetle has previously been found. The work has included a close examination of fields, gardens, fence rows, and the premises of gins, mills, and industrial yards in the vicinity of known infestations and hundreds of miles along highways and railroad rights-of-way. All areas around isolated infestations, including properties on which tenants live who have moved from the infested area, are inspected to determine whether any beetles might have been transported with crops or other effects, but no infestation has been found that could be traced to such movement. Barrier ditches are sprayed with kerosene one to five times a week, and checked for frequently needed repairs resulting from rains. Inspection for the purpose of cooperative enforcement of State quarantines is made of such commodities as farm produce, cotton, and forest products, soil, scrap iron, household goods, and livestock moving from the infested areas. The movement of cotton products requires the issuance of from 500 to 900 permits weekly.

Woodlands inspected for the white-fringed beetle.--In addition to the regular survey for the white-fringed beetle, several inspectors are searching woodlands in the vicinity of infested fields to determine if established infestations exist in cut-over or forested land. The finding of larvae in such lands at relatively short distances from infested fields indicates that infestations may become established and survive in such growth. Native host plants have also been located in woodlands on which adult beetles were feeding.

Progress in sweetpotato weevil control.--Inspection for the sweetpotato weevil was continued in August in a belt of 36 counties extending through the southern parts of Alabama and Mississippi, central Louisiana, and northeastern Texas, and the work is approaching the point of setting up a definite cooperative control and eradication program in each of the States. Inspections to date have been chiefly confined to the seedbeds and infestations have been found during the season in each of the above States. When the weevils are found, the survey work is intensified for the purpose of determining whether the infestation is local or general, particularly on the outer rim of the known infested area, the inspection generally covering a radius of 3 to 10 miles of such areas. Eradication is carried on along with the survey work and owners of infested seedbeds are removing and destroying the vines and tubers. The limits of areas in which the eradication project will be conducted has been determined in six counties in Mississippi.

Peach disease control activities.--In the eradication of abandoned and worthless peach trees for the control of the peach mosaic and phony peach diseases, operated as relief projects, field leaders have centered their efforts during the past 2 months on diseased trees, and a larger number of relief employees have been working in July and August in order that trees infected with these diseases may be removed at the time of inspection, thus reducing the possible spread of infection to a minimum. As a result, more diseased trees have been removed during the past 2 months than were so removed during the same period last year. In August, an average of nearly 600 persons were employed in tree removal work in Alabama, Arkansas, California, New Mexico, Tennessee, and Texas. Inspection for the diseases was conducted in August in Alabama, Arizona, Arkansas, California, Colorado, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

Citrus canker eradication.--The August work on citrus canker activities represented the completion of the removal of abandoned host plants in Mobile County, Ala., the continuation of such work in Baldwin County, Ala., and in West Florida with reduced crews of relief laborers. In Texas reinspections in the counties of Jefferson, Orange, Brazoria, and Galveston resulted in finding no citrus canker in areas known in recent months to represent infection centers. Relief laborers in Texas continued the removal of abandoned citrus trees located by the inspectors.

Transit inspection activities.--The inspection of railway produce cars originating in areas infested with the Japanese beetle was continued in August at the regular inspection points in the Middle West and also under brief assignments at Detroit, Cleveland, Toledo, and Columbus, Ohio, with the result that only one live Japanese beetle was found during the month in such shipments. This was at Chicago. While the month of August generally shows a marked decline in plant shipments of commercial origin, the Kansas City inspector found there was an increase in the consignments of noncommercial plant shipments, resulting in the interception of twice as many violations in August as in July. Summer inspection has not heretofore been conducted in Kansas City, and the results of the present assignment show that such activity is fully justified.

CONTROL INVESTIGATIONS

Paired lateral vessels found extending from the heart in the cockroach.--In an investigation of insect heart morphology, N. E. McIndoo, of the Beltsville laboratory, has found paired lateral vessels extending from the heart in the cockroach *Periplaneta americana*, thus confirming the observations of Alexandrowicz. These vessels seem to be plugged with loose tissue at their junctions with the heart and appear gradually to become smaller as they extend away from the heart. Their functions have not been determined.

Ethyl bromide as a fumigant.--In recent work on fumigation for Japanese beetle, A. C. Johnson and J. W. Bulger tested ethyl bromide in comparison with methyl bromide. It was found that whereas methyl bromide gave a complete kill of the adult Japanese beetle at a dosage of 1 pound per 1,000 cubic feet, no kill was obtained with ethyl bromide when used under the same conditions, even with a dosage of 13 pounds per 1,000 cubic feet.

INSECTICIDE INVESTIGATIONS

Determination of minute quantities of nicotine vapor.--H. H. Richardson and R. L. Busbey have recently described a laboratory apparatus for the fumigation of aphids with low concentrations of nicotine [Jour. Econ. Ent. 30(4): 576-582. 1937]. The method of determining the concentration of nicotine vapor used in these tests is that devised by J. R. Spies, of the Division of Insecticide Investigations, and described in Industrial and Engineering Chemistry, Analytical Edition, volume 9, pages 46-47. Richardson and Busbey found that as little as one part nicotine per million parts air killed large numbers of the peach aphid.

Manufacture of nicotine peat.--L. N. Markwood [Jour. Econ. Ent. 30 (4): 648-651. 1937] has just published a description of the semicommercial manufacture of nicotine peat. From New Jersey reed peat a product was made that contained 10.6 percent total nicotine, of which 9.3 percent was insoluble in water at a dilution of 1-2000.

Isolation of rotenone from Tephrosia toxicaria.--H. A. Jones and W. N. Sullivan [Jour. Econ. Ent. 30(4): 679-680. 1937] have for the first time reported the isolation of rotenone from the South American plant *Tephrosia toxicaria*. Against houseflies the best sample of this plant showed a toxicity equivalent to a rotenone content of about 3 percent.

Surface tension of soap solutions.--H. L. Cupples [Indus. Engin. Chem., Indus. Ed., 29(8): 924-926. 1937] has continued his study of the wetting and spreading properties of aqueous solutions. He has shown that the surface tension of a soap decreases with increase in molecular weight of the fatty acid. The curves for the palmitate, myristate, oleate, laurate, and n-caprate are close together and form a rather distinct group from the curves for the n-caprylate and n-caproate, which are more widely separated from each other and from those of the acids of higher molecular weight. The wetting power of a soap solution, as measured by its spreading coefficient on mineral oil, is closely related to its foam-producing power, dirt-suspending power, and efficiency as a detergent. Others have shown that the wetting power of a contact spray is directly related to its insecticidal efficiency. The influence of wetting power in sprays that function as stomach poisons or protective fungicides merits investigation.

BEE CULTURE

Physocephala affinis, a parasite of the honeybee.--Various dipterous parasites of the honeybee have been reported in the past but the recent identification by D. G. Hall, of the Division of Insect Identification, of certain parasites on bees sent the Division of Bee Culture from North Dakota as *Physocephala affinis* Will, of the family Conopidae, is of special interest since this insect has been rarely, if ever, reported before as a parasite of the honeybee, in this country at least.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Another beetle found boring in lead cable.--A beetle recently submitted for identification was accompanied by the report it had been found actually boring into the lead sheathing of aerial telephone cables at Greenville, Miss. A coating of black paint and sand had been penetrated before the cable itself was entered. More than 20 short circuits during the past summer were attributed to this species, which has been identified by W. S. Fisher as *Schistoceros hamatus* F., of the family Bostrichidae.

A remarkable blind beetle discovered in Texas.--Several specimens of a minute, blind, and wingless beetle that had been taken in the Bay City Rice Mill, Bay City, Tex., were recently received for determination. They have been identified by W. S. Fisher as *Thaumaphrastus karanisensis* Blaisdell (Colydiidae), which was originally described from a fragmentary specimen taken in a grave in the buried ruins of an old Egyptian city. Wild rice was frequently placed with the body at burial and it is presumed that the insect entered the grave in this manner. Specimens of the same species were intercepted earlier this year at Thayer, Tex., in *Oryza sativa* coming from Mexico.

UNIVERSITY OF FLORIDA
3 1262 09243 4520

A species of Buprestidae reported injurious to cotton.--Beetles said to be cutting off the branches of cotton stalks at Grandfalls, Tex., were submitted for identification by R. A. Vickery and have been determined by W. S. Fisher as Psiloptera drummondi C. & G. (Buprestidae). No injury of that character has previously been reported for this buprestid, the only available record indicating that the adults feed on flowers of certain plants. The larvae are unknown. The infested cotton field is bordered by a row of dead and dying cedars. Very possibly the larvae of P. drummondi are developing in those trees, which would account for the unusual occurrence of the adults in the cotton field.

Damage to strawberries by larvae of Acrolophus.--There were recently received for determination moths of two species of the genus Acrolophus (Tineidae) which had been reared from larvae taken in strawberry fields in southeastern Virginia. They have been identified by August Busck as A. arcanellus Clem. and A. plumifrontellus Clem. H. G. Walker, of the Virginia Truck Experiment Station at Norfolk, submitted the material with the report that several acres of strawberries had been almost completely destroyed. The larvae remain during the day in tubes constructed among the grass roots and feed only at night. Because of this habit their abundance may easily be underestimated and injury caused by them attributed to other forms.

Melissopus latiferreanus a pest of apricots in California.--Ralph H. Smith, of the University of California at Los Angeles, recently forwarded for determination two moths reared from larvae infesting apricots in San Bernardino County, and reported that 10 percent of the fruit had been attacked. The species was identified by Carl Heinrich as Melissopus latiferreanus Wlsm. The normal hosts for the larvae are oak acorns and oak galls, although beech nuts, chestnut burrs, and walnuts are also attacked. No previous record has been available for the occurrence of this species as a pest of apricots.

A membracid injurious to chrysanthemums.--Specimens of a species of Membracidae found by H. L. Dozier to be causing serious injury to commercial plantings of chrysanthemums at Opelousas, La., have been identified by P. W. Oman as Vanduzea segmentata Forel. This species was not previously known to occur in Louisiana.

A European leafhopper attacking elms in the United States.--Specimens of a leafhopper reported by G. F. Knowlton to be damaging Siberian elms at Roosevelt, Utah, September 2, 1937, have been tentatively identified by P. W. Oman as Empoasca punctum Haupt, a species originally described from Germany. In connection with this determination records of species of Empoasca occurring on elm were requested of Nancy H. Wheeler, of the Arlington Experiment Station, who kindly furnished specimens collected from European elm at Chestnut Hill, Pa., August 3, 1930, by F. F. Smith. Upon examination these proved to be identical with the Utah specimens. In addition to these two records, the National Museum collection contains three females, which appear to be the same species, from Talovaia, Union of Soviet Socialist Republics.

---o0o---